

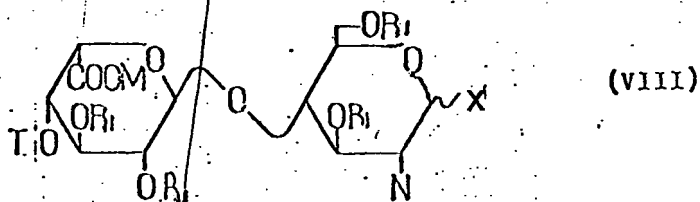
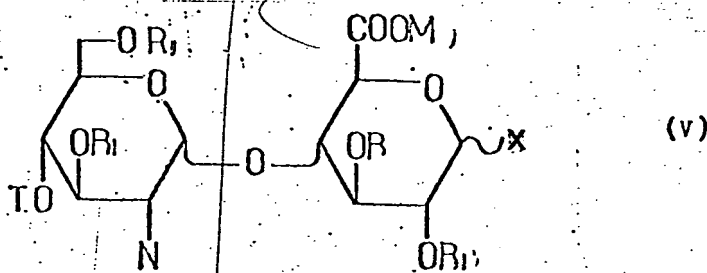
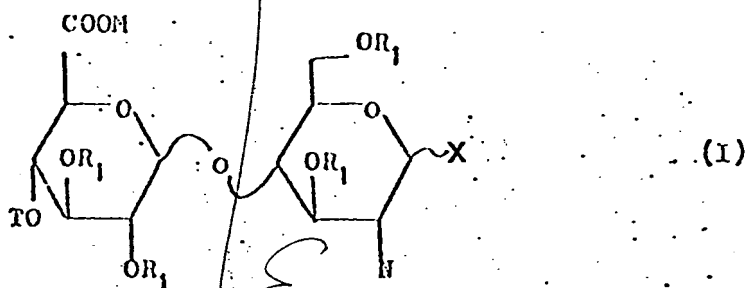
the 4 position of the neighboring saccharide.

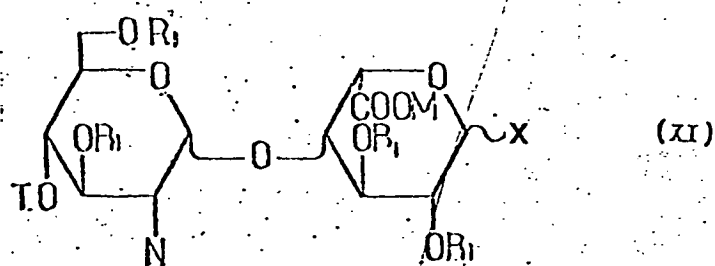
50. (Amended) The oligosaccharide of claim 49 having the structure of a heparin or heparin sulfate fragments which comprises,

$\underline{c1} \xrightarrow{\alpha} \underline{4a}$ ,  $[\underline{a1} \xrightarrow{\alpha} \underline{4b}]$ ,  $\underline{a1} \xrightarrow{\alpha} \underline{4b}$ ,  $\underline{a1} \xrightarrow{\alpha} \underline{4c}$  and

$\underline{b1} \xrightarrow{\beta} \underline{4a}$  linkage wherein a is D-glucosamine, b is D-glucuronic acid and c is L-iduronic acid.

51. (Amended) An oligosaccharide of the formula  
selected from the group consisting of





wherein

T is hydrogen or a [reactive radical ultimately replaceable] group which can be replaced by a saccharide,

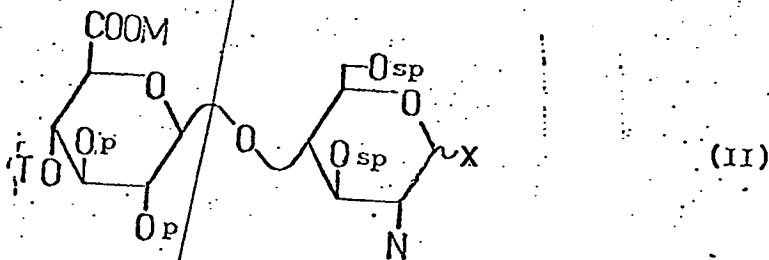
X is OH or a [reactive radical ultimately replaceable] group which can be replaced by a saccharide,

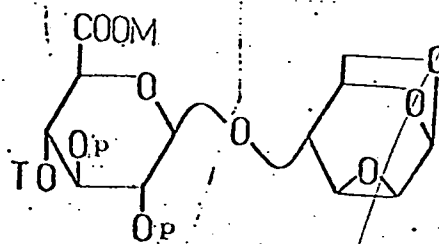
N is a radical containing a nitrogen group or a precursor thereof,

M is hydrogen, a sulfate group or a [reactive radical ultimately replaceable] group which can be replaced by hydrogen, and

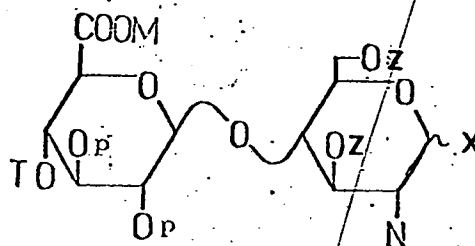
R<sub>1</sub> is the same or different and is hydrogen, acyl from 1 to 8 carbons, [substituted] alkyl from 1 to 9 carbons or sulfate.

52. (Amended) An oligosaccharide of the formula selected from the group consisting of





(III)



(IV)

wherein

T is acyl from 1 to 8 carbons, halogenated acyl from 1 to 8 carbons, substituted alkyl from 7 to 19 carbons, O-sulfate ester, O-phosphate ester or hydrogen,

X is O-acyl from 1 to 8 carbons, O-alkyl from 1 to 3 carbons, O-substituted alkyl from 7 to 19 carbons, halogen or imidoyl,

p is substituted alkyl from 7 to 19 carbons, O-sulfate ester, O-phosphate ester or hydrogen,

sp is acyl from 1 to 8 carbons, O-sulfate ester, O-phosphate ester or hydrogen,

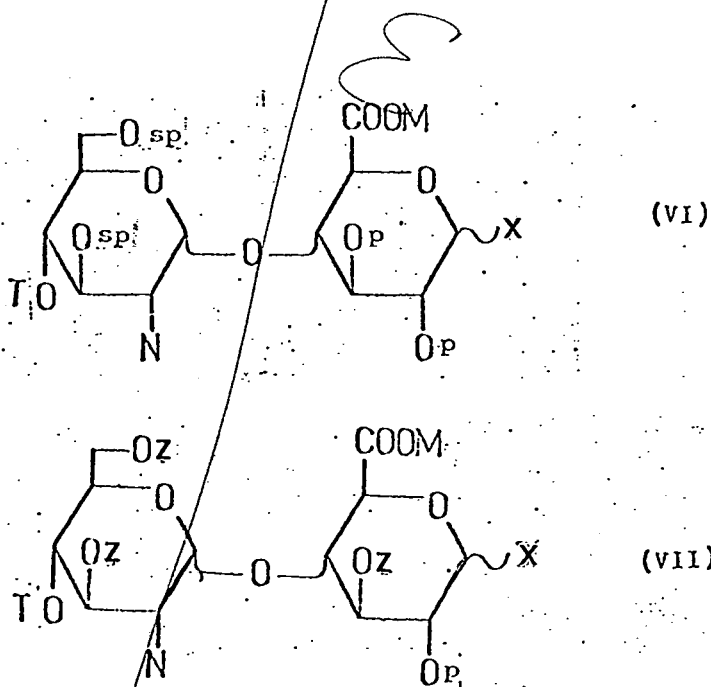
Z is acyl from 1 to 8 carbons, substituted alkyl from 7 to 19 carbons, O-sulfate ester, O-phosphate ester or hydrogen,

M is hydrogen or alkyl from 1 to 3 carbons, and

N is an azide group.

53. (Amended) The oligosaccharide of claim 52 wherein  
 T is acetyl, monochloroacetyl, trichloroacetyl,  
 benzyl, paramethoxybenzyl, or hydrogen,  
 X is O-acetyl, O-methyl, O-benzyl, bromide or imidoyl,  
 p is benzyl,  
 sp is acetyl, sulfate ester, phosphate ester or  
 hydrogen,  
 Z is benzyl, acetyl or hydrogen, and  
 M is hydrogen or methyl

54. (Amended) An oligosaccharide of the formula  
selected from the group consisting of



wherein

T is acyl from 1 to 8 carbons, halogenated acyl from 1 to 8 carbons, substituted alkyl from 7 to 19 carbons, O-sulfate ester, O-phosphate ester or hydrogen,

X is O-acyl from 1 to 8 carbons, O-alkyl from 1 to 3 carbons, O-substituted alkyl from 7 to 19 carbons, halogen, imidoyl or hydrogen,

p is substituted alkyl from 7 to 19 carbons or hydrogen,

sp is acyl from 1 to 8 carbons or hydrogen,

Z is acyl from 1 to 8 carbons, substituted alkyl from 7 to 19 carbons or hydrogen,

M is alkyl from 1 to 3 carbons or hydrogen, and

N is azide or substituted amine.

55. (Amended) The oligosaccharide of claim 54 wherein

T is acetyl, monochloroacetyl, trichloroacetyl, benzyl paramethoxybenzyl, or hydrogen,

X is O-acetyl, O-methyl, O-benzyl, bromide, imidoyl, O-propenyl, O-allyl or OH,

p is benzyl,

sp is benzyl, acetyl, sulfate ester, phosphate ester or hydrogen,

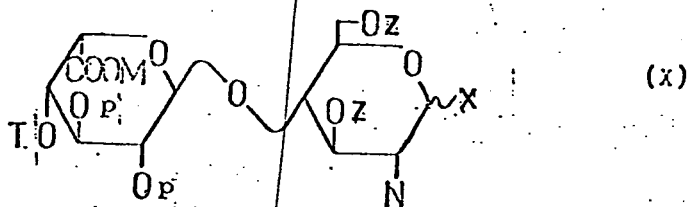
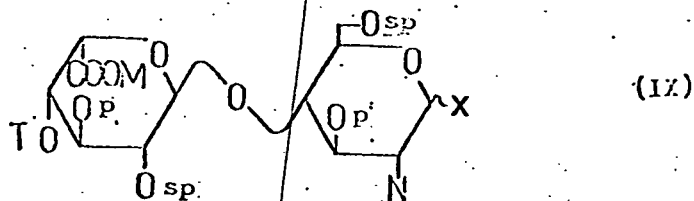
Z is benzyl, acetyl or hydrogen,

M is hydrogen or methyl, and

N is azide or NH-acetyl.

56. (Amended) The oligosaccharide of the formula

selected from the group consisting of



wherein

T is acyl from 1 to 8 carbons, halogenated acyl from 1 to 8 carbons, [substituted aracyl,] substituted alkyl from 7 to 19 carbons or hydrogen

X is O-acyl from 1 to 8 carbons, O-alkyl from 1 to 3 carbons, O-substituted alkyl from 7 to 19 carbons, halogen or imidoyl,

sp is acyl from 1 to 8 carbons, [aryl] substituted alkyl from 7 to 19 carbons or hydrogen,

p is acyl from 1 to 8 carbons, [aryl,] substituted alkyl from 7 to 19 carbons or hydrogen,

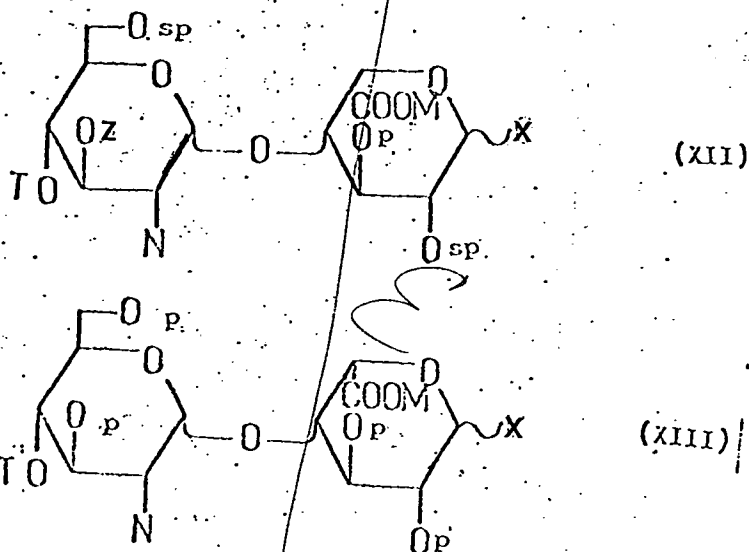
z is acyl from 1 to 8 carbons, [aryl,] substituted alkyl from 7 to 19 carbons or hydrogen,

M is hydrogen or alkyl from 1 to 3 carbons,

N is azide or NHCOO-(substituted alkyl).

57. (Amended) The oligosaccharide of claim 56 wherein  
 T is acetyl, monochloroacetyl, trichloroacetyl,  
 benzyl, paramethoxybenzyl or hydrogen,  
 X is O-acetyl, O-methyl, O-benzyl, bromide or imidoyl,  
 p is acetyl, benzoyl or benzyl,  
 sp is acetyl, sulfate ester, phosphate ester, benzoyl  
 or benzyl,  
 Z is acetyl, benzoyl or benzyl,  
 M is hydrogen or methyl, and  
 N is azide,  $\text{NHCOOCH}_2\text{C}_6\text{H}_5$ .

58. (Amended) An oligosaccharide of the formula



wherein

T is acyl, halogenated acyl from 1 to 8 carbons,  
 substituted alkyl from 7 to 19 carbons or hydrogen,

X is O-acyl from 1 to 8 carbons, O-alkyl from 1 to 3  
carbons, O-substituted alkyl from 6 to 7 carbons, halogen or

imidoyl,

p is substituted alkyl from 7 to 19 carbons or hydrogen,

sp is acyl from 1 to 8 carbons or hydrogen,

z is acyl from 1 to 8 carbons, substituted alkyl from 7 to 19 carbons or hydrogen,

M is hydrogen or alkyl from 1 to 3 carbons, and

N is azide.

59. (Amended) The oligosaccharide of claim 58 wherein

T is acetyl, monochloroacetyl, trichloroacetyl, benzyl, paramethoxybenzyl, or hydrogen

X is O-acetyl, O-methyl, O-benzyl, bromide or imidoyl,

p is benzyl,

sp is acetyl, sulfate ester, phosphate ester or hydrogen,

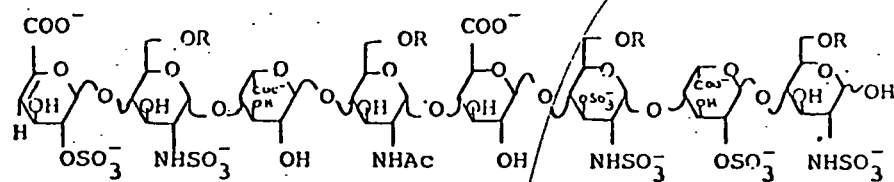
z is benzyl, acetyl or hydrogen, and

M is hydrogen or methyl.

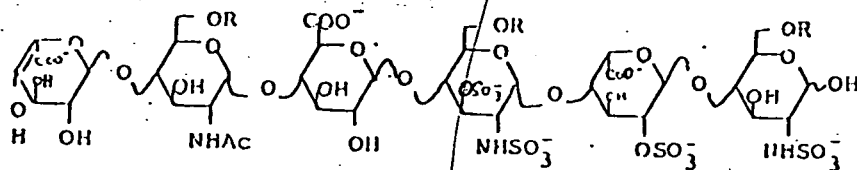
60. (Amended) An oligosaccharide having the structure selected from the group consisting of

ABCDEFGF, C'DEFGH, AB, BC, CD, DE, EF, FG, GH, ABC, BCD, CDE, DEF, EFG, [EFGN,] FGH, ABCD, BCDE, CDEF, DEFG, EFGH, ABCDE, BCDEF, CDEFG, DEFGH, ABCDEF, BCDEFG, CDEFGH, or BCDEFGH

wherein the letters A, B, C, C', D, E, F, G and H correspond to the structures of the formulas

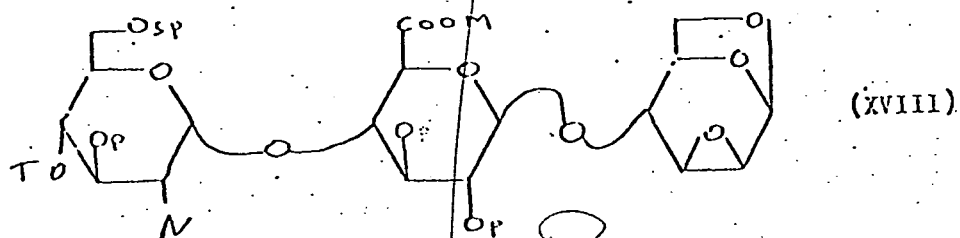


A B C D E F G H

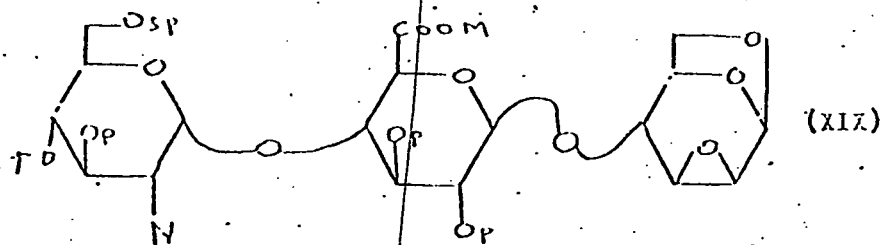


C' D E F G H

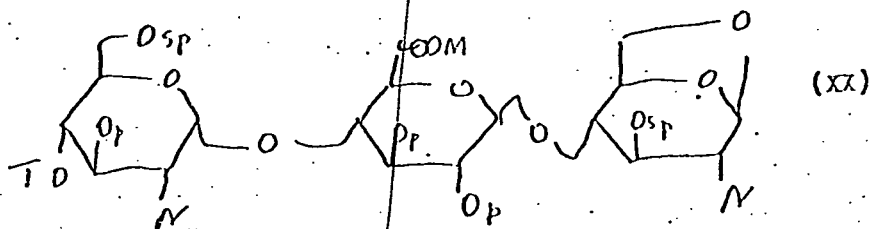
61. (Amended) The oligosaccharide [of claim 60]  
 having the formula selected from the group consisting of



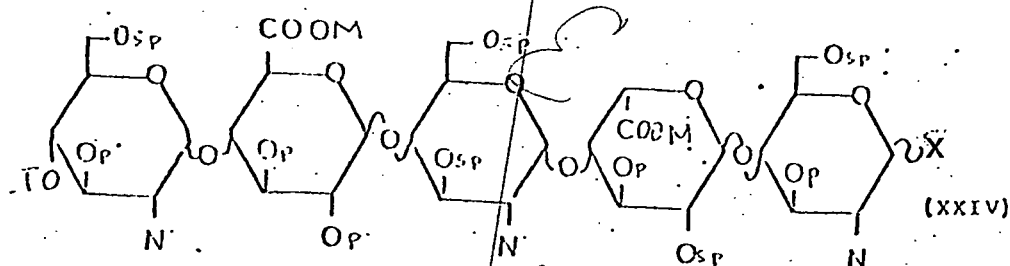
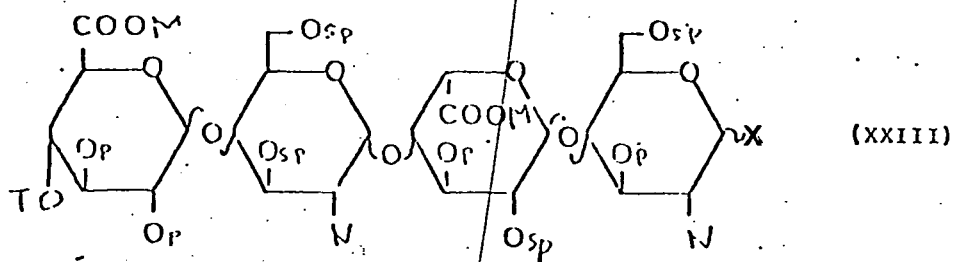
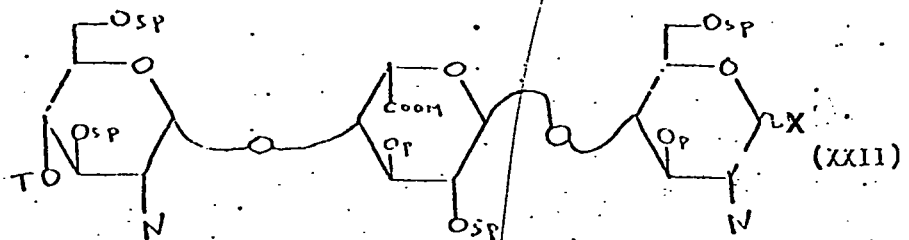
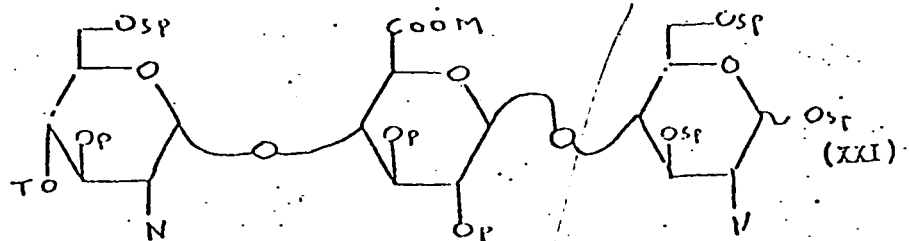
(XVIII)



(XIX)



(XX)



wherein

T is acyl from 1 to 8 carbons, halogenated acyl from 1 to 8 carbons, substituted alkyl from 7 to 19 carbons or hydrogen,

X is O-acyl from 1 to 8 carbons, O-alkyl from 1 to 3 carbons, O-substituted alkyl from 7 to 19 carbons, [halogenated] halogen or imidoyl,

p is substituted alkyl from 7 to 19 carbons or hydrogen,

sp is acyl from 1 to 8 carbons or hydrogen,

M is alkyl or hydrogen, and  
N is azide, or substituted amino.

62. (Amended) The oligosaccharide of claim 61 wherein  
T is acetyl, monochloroacetyl, trichloroacetyl,  
benzyl, paramethoxybenzyl or hydrogen,

X is O-acetyl, O-methyl, O-allyl, O-propenyl,  
O-benzyl, bromide or imidoyl,

p is benzyl or hydrogen,

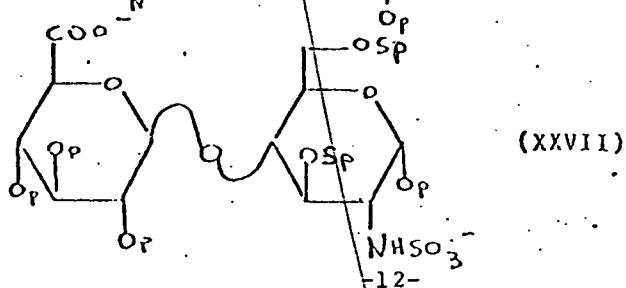
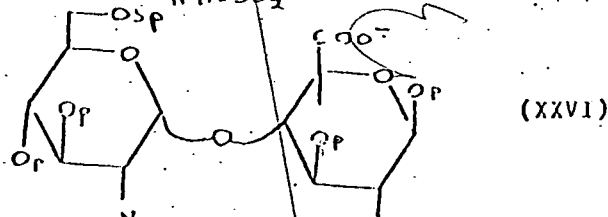
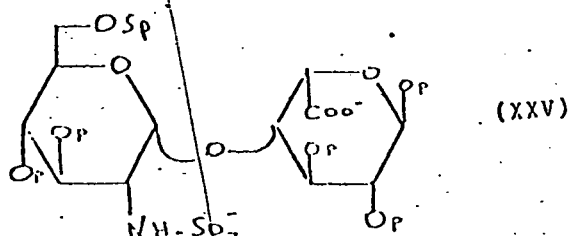
sp is acetyl, sulfate ester, phosphate ester or  
hydrogen,

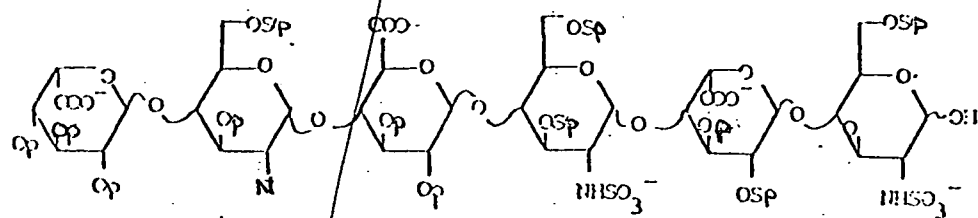
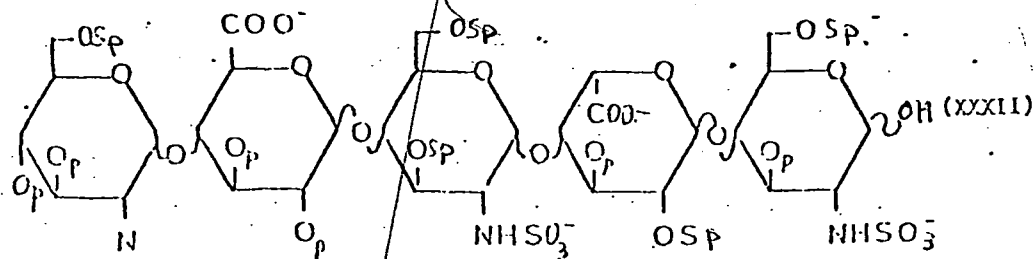
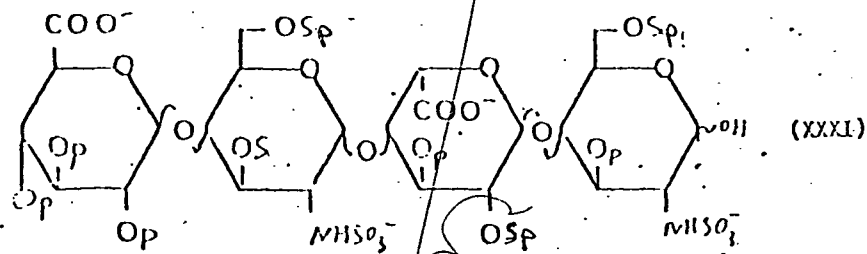
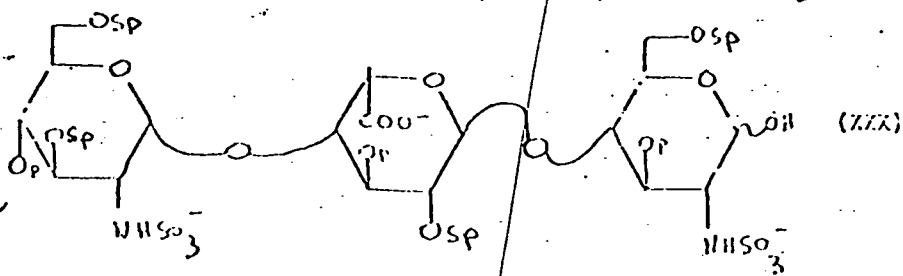
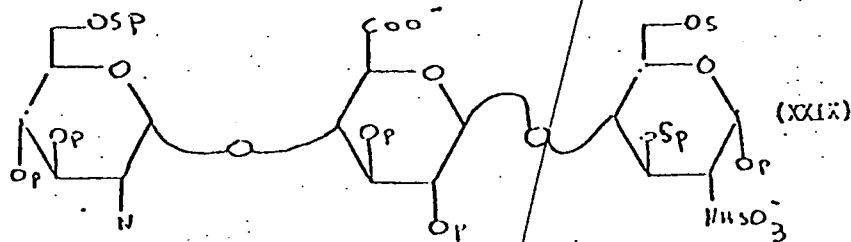
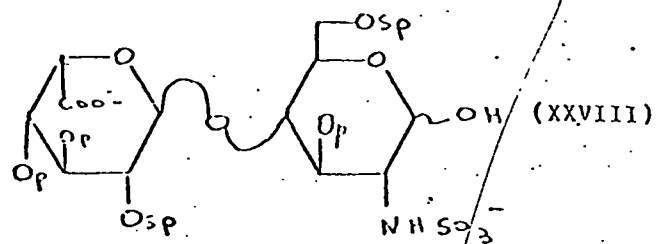
M is hydrogen or methyl, and

N is azide, NH acetyl, NHCOO-acetyl or

NHCOOCH<sub>2</sub>C<sub>6</sub>H<sub>5</sub>.

64. (Amended) An oligosaccharide of the formula  
selected from the group consisting of



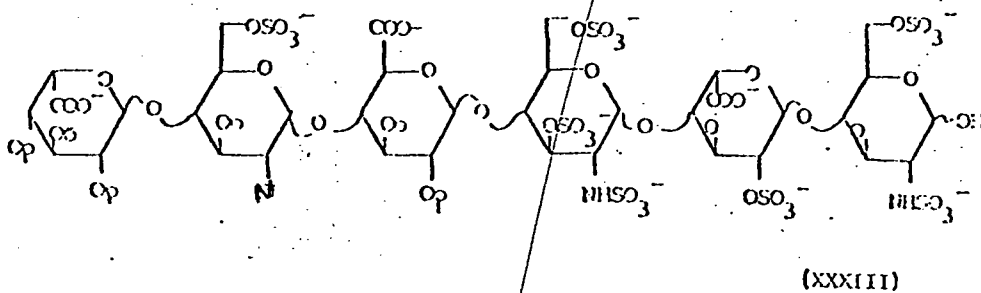


wherein N is NH-acyl or  $\text{NHSO}_3^-$ ,

p is benzyl or hydrogen,

sp is  $\text{SO}_3^-$  or H, and its pharmaceutically acceptable salts.

71. (Amended) The pharmaceutical composition of claim [69] 70 wherein the compound has the formula



wherein

N is  $\text{NHSO}_3^-$  or NH-acyl and

p is hydrogen.

72. (Amended) The pharmaceutical composition of claim [69] 70 wherein the compound has the formula

